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tions to all the others could be predicted by direct measurement from the model.

¹ Metz, C. W., *Genetics*, 3, 1918, (107-134).

² From measurement of the model, it may be predicted that the cross-over percentage between magenta and hairy will be about 4 or 5, and the glazed-rugose percentage about the same, probably a little greater. The position of frayed in the system is not fully determined, as only two linkage relations of frayed are known. But it may be predicted, from measurement, that the frayed-forked cross-over percentage will lie between 39 and 41, and that frayed-glazed will lie between 43 and 46, provided of course that the relations given in table 1 have been determined with sufficient accuracy.

THE CAUSE OF PROLIFERATION IN BEGONIA
PHYLLOMANIACA

BY ERWIN F. SMITH

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Read before the Academy, November 18, 1918

The cause of the excessive production of adventive shoots on the leaves and internodes of this plant (a very strange phenomenon) is attributed to excessive loss of water, due to woundings or other causes. Usually in regeneration the response is not far from the place of injury, here it may be at a long distance from the wounded part, e.g., roots wounded and response in the top of the plant, although a direct response from the injured part can also be obtained. The paper will be published in full in *The Journal of Agricultural Research*. The following is a synopsis:

1. Ordinary begonia leaves when detached from the plant and pegged down on moist sand develop roots and shoots from cut places and this method is used by gardeners for the propagation of begonias. Many other plants are propagated in this way, e.g., the hyacinth from bulb scales.

2. But the leaves and shoots of this begonia *proliferate while still attached to the plant*.

3. They will proliferate on the plant very freely when wounded, making small forests of shoots on the thickened red lips of the wound if the wounds are made in quite young tissues, but not otherwise (young leaf blades were used).

4. They will frequently proliferate in the top parts of cuttings (on leaves and internodes) especially if the cuttings are dried for a day or two before planting.

5. They will proliferate most astonishingly at the top of the plant (both from leaves and internodes) if the roots are wounded, but here again only quited young tissues can be shocked into the production of such shoots. This is the most striking fact I have discovered, viz., that the proliferation may occur at a long distance from the place of wounding and must be from young

tissues. So far as known to the writer, it is the first example of response of this sort at a distance from the point of injury.

6. I have also some evidence that leaves will proliferate locally under colonies of sucking insects (mealy bug, white fly), also that withholding water from the plant for a few days will cause it to proliferate.

7. The nature of the shock appears to lie in the sudden interruption of the water current which is conceived to cause cell-precipitates or plasmolysis of young totipotent cells which begin to grow when they have recovered from the shock.

8. The proliferation at times is so much like a forest that one must assume that the whole surface (epidermis) of immature shoots is full of cells capable of growing into new plants if properly shocked but that as the tissue matures these cells either lose their power of response, or become more perfectly protected.

9. These adventive shoots, for the most part, perish quickly and cannot be regarded as branches, since they have no initial connection with the ordinary cambium, or xylem-phloem of the mother plant. They are rather to be classed with filial teratomas. Later, a small proportion of them establish connections with the conductive tissues of the mother and persist, i.e., become abnormally situated branches.

10. My observations contradict those of Prillieux and confirm those of Verlot and of Caruel that buds may arise from the ordinary trichomes. They may develop either from the base or the middle of acicular hairs. Such hairs arise from a red tissue, the other parts of the epidermis being green. I have also seen them developing from the base of glandular hairs which are abundant on the young internodes, but they are not restricted to these pairs.

THE PERCENTAGE NUMBER OF METEORITE FALLS AND
FINDS CONSIDERED WITH REFERENCE TO THEIR
VARYING BASICITY

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Communicated by C. G. Abbot, January 9, 1919.

Various compilations relating to time and distribution of meteorite falls have been made with a view of correlating them with periodic showers, but, with, thus far, the only result of showing that there is no apparent connection between them.¹ Viewing the subject from a geological standpoint, that is, from the standpoint of an earth made up by the gradual accumulation of meteoric materials, and considering also the apparent more basic nature of the earth's interior as compared with the outer portion, I have thought it possible some light might be thrown upon it through a consideration of the